

What Is Claimed Is:

1. An engine comprising:
  - a turbine casing;
  - 5 an exhaust manifold coupled to the turbine casing wherein the turbine casing and the exhaust manifold are formed as one piece; and
  - a cooling structure integrated in the turbine casing and the exhaust manifold wherein the cooling structure allows a coolant to circulate around portions of the turbine casing and the exhaust manifold.
- 10 2. The engine according to claim 1 wherein the cooling structure comprises:
  - an inner wall;
  - an outer wall spaced from the inner wall to define a cavity there between wherein the coolant circulates in the cavity.
3. The engine according to claim 2 wherein the outer wall of the cooling structure forms at  
15 least a portion of the turbine casing and the exhaust manifold.
4. The engine according to claim 1 wherein the cooling structure has an input for each bend of the exhaust manifold.
5. The engine according to claim 1 wherein the cooling structure has an outlet positioned near an exhaust gas outlet of the turbine casing.
- 20 6. The engine according to claim 5 wherein the outlet comprises a plurality of outlets positioned around the exhaust gas outlet.
7. An engine cooling system comprising
  - a first cooling circuit for cooling an engine block; and

a second cooling circuit for cooling a turbine bearing housing, the second cooling circuit having an input coupled to the first cooling circuit at a first location and an output coupled to the first cooling circuit at a second location.

8. The system according to claim 7 wherein the first cooling circuit has a pump and the first location is downstream of the pump and the second location is upstream of the pump.

9. The engine according to claim 1 wherein the turbine casing is made of a metal selected from the group consisting of a low-alloy steel, a gray cast iron and aluminum.

10. An engine comprising:

a turbine casing;

an exhaust manifold coupled to the turbine casing wherein the turbine casing and the exhaust manifold are formed as one piece;

a cooling structure integrated in the turbine casing and the exhaust manifold wherein the cooling structure allows a coolant to circulate around portions of the turbine casing and the exhaust manifold; and

an engine cooling system comprising

a first cooling circuit for cooling an engine block; and

a second cooling circuit for cooling a turbine bearing housing, the second cooling circuit having an input coupled to the first cooling circuit at a first location and an output coupled to the first cooling circuit at a second location.

11. The engine according to claim 10 wherein the cooling structure comprises:

an inner wall;

an outer wall spaced from the inner wall to define a cavity there between wherein the coolant circulates in the cavity.

12. The engine according to claim 11 wherein the outer wall of the cooling structure forms at least a portion of the turbine casing and the exhaust manifold.

13. The engine according to claim 10 wherein the cooling structure has an input for each bend of the exhaust manifold.

5 14. The engine according to claim 10 wherein the cooling structure has an outlet positioned near an exhaust gas outlet of the turbine casing.

15. The engine according to claim 14 wherein the outlet comprises a plurality of outlets positioned around the exhaust gas outlet.

10 16. The system according to claim 10 wherein the first cooling circuit has a pump and the first location is downstream of the pump and the second location is upstream of the pump.

17. The engine according to claim 10 wherein the turbine casing is made of a metal selected from the group consisting of a low-alloy steel, a gray cast iron and aluminum.

18. A personal watercraft comprising:

a hull;

15 a deck positioned on the hull;

a propulsion device;

an engine for driving the propulsion device; the engine comprising:

a turbine casing;

an exhaust manifold coupled to the turbine casing wherein the turbine casing and the

20 exhaust manifold are formed as one piece; and

a cooling structure integrated in the turbine casing and the exhaust manifold wherein the cooling structure allows a coolant to circulate around portions of the turbine casing and the exhaust manifold.

19. The personal watercraft according to claim 18 further comprising:
- a first cooling circuit for cooling an engine block; and
  - a second cooling circuit for cooling a turbine bearing housing, the second cooling circuit having an input coupled to the first cooling circuit at a first location and an output coupled to the
- 5 first cooling circuit at a second location.
20. The personal watercraft according to claim 18 wherein the turbine casing is made of a metal selected from the group consisting of a low-alloy steel, a gray cast iron and aluminum.